FEATURE ARTICLE

A revolution in web cleaning and static control

In recent years there has been an increasing trend towards the use of coatings which contain nanoparticles being applied to webs to enhance their functionality, especially their optical properties. However, these coatings are extremely thin and are therefore very susceptible to defects caused by microscopic particles of contamination on the surface of the web. The only effective way of removing these particles is through the use of contact cleaning technology. However, as this involves touching the surface of the web with the cleaning roller there is an interfacial reaction, caused predominately by static electricity, between the roller and the substrate which can have a detrimental effect on the quality of extremely thin coated layers.

The consequences of contamination and static in the converting industries are well known – lower production yields, increased material wastage and greater downtime when problems arise.

Teknek invented contact cleaning technology over 20 years ago and has remained at the forefront of technological developments in this sector ever since. The company has responded to the increased use of thinner coatings with the development of a second generation contact cleaning system – Nanocleen – which offers enhanced cleaning and static elimination capabilities. Nanocleen offers a number of advantages to the converting sector including:

- Being able to remove much smaller particles – down to 25nm. It can also remove 25-50% more particles than other contact cleaners.
- Contact roller and adhesive roll are 100% silicon-free.
- Polymer roller dissipates static as well as removing contamination. The roller reduces static by a factor of 10 compared to traditional contact rollers. This is especially useful when processing very thin film as the film tends to cling to the roller due to static.

- Very low impact on surface energy -- dyne levels are 85% less than traditional contact cleaning roller.
- Nanocleen cleaning system can be installed on old and new Teknek clean machines as well as other makes of contact cleaning equipment (using a optimal upgrade kit)>

The Nanocleen technology has been beta-tested by a number of Teknek customers as follows:

Casestudy A

A major Japanese customer whose process is adversely affected by static carried out extensive trials with Nanocleen with a view to improving yields. Experiments were conducted with a web contact cleaner using traditional cleaning core components and Nanocleen. Table 1 clearly demonstrates the the unique static dissipation properties of the Nanocleen system.

The Nanocleen cleaning roller is made using a specially formulated polymer which amongst other things is inherently conductive, and therefore it conducts static charge away to earth.

Web cleaners come in many forms with contact web cleaners being the most effective. However, some web cleaners use components which reintroduce organic contamination on to the web. This is primarily due to two factors. Firstly, the base polymer of the cleaning roller is PDMS – a silicone. Secondly, the adhesive used in these systems all have a silicon release coating which can transfer the silicon on to the cleaning roller and then on to the substrate.

Case study B

Extensive trials of Nanocleen with a major Asian supplier of coating and converting equipment used to produce very thin films (in particular optical films) has shown that by replacing traditional cleaning core components –

cleaning roller and adhesive – Nanocleen ensures that issues relating to poor coating performance due to the cleaning system have been eliminated.

Nanocleen is the only 100% Silicon free cleaning system for contact cleaning in the world. Not only is the cleaning roller silicon free but the Nanocleen adhesive is the only one which does not have a silicon release coating on the adhesive.

Case study C

The role of contaminants from the cleaning roller and the impact on the surface energy of the substate were investigated by a major US producer of technical films. The impact of the cleaning roller on the substrate was measured using a highly sensitive technique called ToF-SIMS (Time-of-Flight Secondary Ion Mass Spectrometry) which showed that Nanocleen was the only commercially available cleaning roller which left nothing on the surface it had cleaned.

For further information about Nanocleen please visit XXXXXXXXXXXXXX

For further information about Teknek please visit www.teknek.com

NB: Nanocleen is a registered trademark.

Table 1 <to be inserted>

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